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(21) 国際出願番号: PCT/JP00/03485 (74) 代理人: 有賀三幸, 外(ARUGA, Mitsuyuki et al.); 〒103-0013 東京都中央区日本橋人形町1丁目3番6号 共同ビル Tokyo (JP).

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(71) 出願人(米国を除く全ての指定国について): 花王株式会社 (KAO CORPORATION) [JP/JP]; 〒103-8210 東京都中央区日本橋茅場町1丁目14番10号 Tokyo (JP).  
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(72) 発明者; および

(75) 発明者/出願人(米国についてのみ): 永澤敦志 (NAGASAWA, Atsushi) [JP/JP]; 木附智人 (KITSUKI, Tomohito) [JP/JP]; 井原 毅 (IHARA, Takeshi) [JP/JP]; 〒

(54) Title: POLYSACCHARIDE DERIVATIVE

(54) 発明の名称: 多糖誘導体

(57) Abstract: A polysaccharide derivative having a structure formed by replacing part or all of the hydrogen atoms of the hydroxyl groups in a polysaccharide or a derivative thereof with a group represented by the formula (1) -E<sup>1</sup>-(OA)<sub>n</sub>-E<sup>2</sup>-R (wherein E<sup>1</sup> represents a C<sub>1-6</sub> divalent saturated hydrocarbon group optionally substituted by hydroxy or oxo; n is a number of 8 to 300; nA's are the same or different and each represents a C<sub>1-6</sub> divalent saturated hydrocarbon group; E<sup>2</sup> represents an ether bond or oxycarbonyl; and R represents C<sub>4-10</sub> alkyl optionally substituted by hydroxy) [the hydrogen atom of the hydroxyl group in the group (A) may be replaced with a group (A)]; a thickener and an emulsifier each comprising the derivative; and an aqueous composition containing the derivative. The polysaccharide derivative has excellent handleability at low temperatures. It is useful in various toiletry as a thickener having sufficient thickening properties at high temperatures or as an emulsifier having excellent emulsifying activity serving as a stabilizer.

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Japanese (PDF)

File Wrapper Information

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## FULL CONTENTS CLAIM + DETAILED DESCRIPTION

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## Notes:

1. Untranslatable words are replaced with asterisks (\*\*\*\*).
2. Texts in the figures are not translated, and shown as it is.

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## CLAIMS

## [Claim(s)]

[Claim 1] all the all [ some or ] of a hydroxy group of polysaccharide or its inductor -- the following group (A)

(A) The group [the hydrogen atom of the hydroxy group of this substituent (A) may be further replaced by the substituent (A)] expressed with a following general formula (1)

-E1-(OA)n-E2-R (1)

E1 shows among [type the divalent saturated hydrocarbon group of the straight chain of the carbon numbers 1-6 which the hydroxy group or the oxo group may replace, or branched chain, n shows the number of 8-300; n A is the same or different, and the divalent saturated hydrocarbon group of the straight chain of carbon numbers 1-6 or branched chain is shown. E2 shows an ether linkage or an oxycarbonyl machine (-OCO- or -COO-), and R shows the alkyl group of the straight chain of carbon numbers 4-30, or branched chain which the hydroxy group may replace. ]

The polysaccharide derivative come out of and replaced.

[Claim 2] (C) C [ the following group (B) and ] All the all [ some or ] of a hydroxy group of a polysaccharide derivative according to claim 1 reach (D).

(B) The group expressed with the carboxy alkyl group of the carbon numbers 2-6 which the sulfoalkyl machine of the carbon numbers 1-5 which the hydroxy group may replace, or the salt (C) hydroxy group may replace, or the salt (D) following general formula (2)



D1 shows among [type the divalent saturated hydrocarbon group of the straight chain of the carbon numbers 1-6 which the hydroxy group may replace, or branched chain. R1, R2, and R3 are the same or different, the alkyl group of the straight chain of carbon numbers 1-3 or branched chain which the hydroxy group may replace is shown, and X- shows a hydroxy ion, a halogen ion, or an organic acid ion. ] It is the polysaccharide derivative replaced by the one or more-\*\*\*\*\* group [the hydrogen atom of the hydroxy group of these groups may be further replaced by a group (A), (B), (C), or (D)].

[Claim 3] About polysaccharide or its inductor, it is the (a) following general formula (3).

E3-(OA)n-E2-R (3)

The straight chain of carbon numbers 1-6 or the alkyl halide machine of branched chain with which the epoxidation alkyl group of carbon numbers 3-6 and the hydroxy group may replace E3 among [type. Or a carboxy group, the carboxy alkyl groups of carbon numbers 2-6, or those inductors are shown. n shows the number of 8-300; n A is the same or different, and the divalent saturated hydrocarbon group of the straight chain of carbon numbers 1-6 or branched chain is shown. E2 shows an ether linkage or an oxycarbonyl machine (-OCO- or -COO-), and R shows the alkyl group of the straight chain of carbon

numbers 4-30, or branched chain which the hydroxy group may replace.]

The manufacturing method of the polyoxyalkylene-ized agent come out of and expressed, and the polysaccharide derivative according to claim 1 made to react.

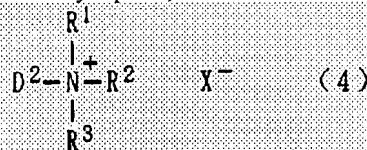
[Claim 4] The manufacturing method of one or more compounds chosen from (b) which shows polysaccharide or its inductor to following (a) and the following, (c), and (d), and the polysaccharide derivative according to claim 2 made to react.

(a) Following general formula (3)

E3-(OA)<sub>n</sub>-E2-R (3)

The straight chain of carbon numbers 1-6 or the alkyl halide machine of branched chain with which the epoxidation alkyl group of carbon numbers 3-6 and the hydroxy group may replace E3 among [type, Or a carboxy group, the carboxy alkyl groups of carbon numbers 2-6, or those inductors are shown. n shows the number of 8-300; n A is the same or different, and the divalent saturated hydrocarbon group of the straight chain of carbon numbers 1-6 or branched chain is shown. E2 shows an ether linkage or an oxycarbonyl machine (-OCO- or -COO-), and R shows the alkyl group of the straight chain of carbon numbers 4-30, or branched chain which the hydroxy group may replace.]

The polyoxyalkylene-ized (agent b) vinyl sulfonic acid come out of and expressed, the haloalkane sulfonic acid of the carbon numbers 1-5 which the hydroxy group may replace. The carboxy-ized agent (d) following general formula (4) chosen from the halogenation carboxylic acid of the carbon numbers 2-6 which the sulfuration agent (c) hydroxy group chosen from the sulfonic acid which has the epoxy group of carbon numbers 2-6, and those salts may replace, and its salt



D2 shows among [type the alkyl halide machine of the straight chain of carbon numbers 1-6, or branched chain which the epoxidation alkyl group of carbon numbers 3-6 or the hydroxy group may replace. The alkyl group of the straight chain of carbon numbers 1-3 or branched chain which R1, R2, and R3 were the same or different, and the hydroxy group may replace is shown, and X- shows a hydroxy ion, a halogen ion, or an organic acid ion.]

The cation-ized agent come out of and expressed [Claim 5] The thickener which consists of a polysaccharide derivative according to claim 1 or 2.

[Claim 6] The emulsifier which consists of a polysaccharide derivative according to claim 1 or 2.

[Claim 7] The aqueous composition containing a polysaccharide derivative according to claim 1 or 2.

## DETAILED DESCRIPTION

### [Detailed Description of the Invention]

Technical field This invention relates to a new polysaccharide derivative with the stabilization effect in which the hydrophobic substance in a new polysaccharide derivative, the unique thickening operation to which it becomes hyperviscosity rather than the time of a room temperature in a high temperature region by excelling in water solubility in detail, and underwater is more advanced than a room temperature, its manufacturing method, and a polysaccharide derivative content aqueous composition.

Background art Polyacrylic acid system compounds, such as cellulose ether, such as a methylcellulose and hydroxyethyl cellulose, or Carbopol, are widely used as a thickener as one of the important composition ingredients, such as a cosmetic and toiletries products.

However, these thickeners are at the time of high temperature, Have the rheology characteristic that viscosity falls and Therefore, a shower agent, In using it by the hot environments in a bathroom etc. as baths etc., in order not to obtain sufficient viscosity and to obtain viscosity, when it was used so much, viscosity increased at the time of preservation in ordinary temperature, and there was a problem of being inconvenient to things and handling with difficult extraction from a container. Therefore, this invention is thickened among warm water at the times of high temperature, such as the time of use in skin superiors, and aims at offering the thickener which has the rheology characteristic which carries out adhesiveness-reducing at the time of a room temperature.

Indication of invention While the new polysaccharide derivative with which this invention person replaces the hydrogen atom of the hydroxy group of polysaccharide by the group containing a specific polyoxyalkylene group has the above unique rheology characteristics While excelling in water solubility and improving the handling nature in the time of low temperature, the inside of warm water, It is obtained by sufficient thickening nature at the times of high temperature, such as the time of use in skin superiors, and Baths, It found out that it was very useful as the various thickener and various stabilizing agents of toiletries products, such as a massage cosmetic, a shower agent, a skin care agent, a charge of hair washing, a whole body cleaning agent, a cleaning agent for garments, coupling finish for garments, and a

hard surface cleaning agent.

That is, as for this invention, all the all [ some or ] of a hydroxy group of polysaccharide or its inductor are the following groups (A).

(A) The group [ the hydrogen atom of the hydroxy group of this substituent (A) may be further replaced by the substituent (A) ] expressed with a following general formula (1)

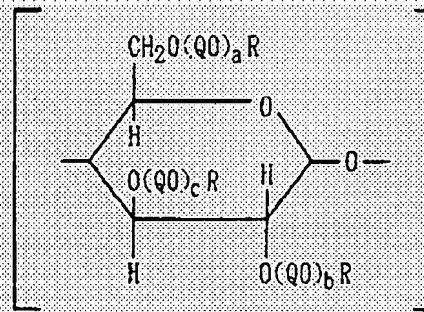
-E1-(OA)<sub>n</sub>-E2-R. (1)

Even if the hydroxy group or the oxo group has replaced E1 among [ type The divalent saturated hydrocarbon group of the straight chain of the good carbon numbers 1-6 or branched chain is shown. n shows the number of 8-300, n A is the same or different, and the divalent saturated hydrocarbon group of the straight chain of carbon numbers 1-6 or branched chain is shown. E2 shows an ether linkage or an oxycarbonyl machine (-OCO- or -COO-), and R shows the alkyl group of the straight chain of carbon numbers 4-30, or branched chain which the hydroxy group may replace. ]

The polysaccharide derivative come out of and replaced and its manufacturing method are offered. Moreover, this invention offers the thickener and emulsifier which consist of the above-mentioned polysaccharide derivative.

Furthermore, this invention offers the aqueous composition containing the above-mentioned polysaccharide derivative.

The best form for inventing If the polysaccharide derivative of this invention mentions as an example the case where celluloses are used as polysaccharide or its inductor, the repeating unit will be illustrated by the following general formulas.



R is the same or different among [ type, and they are (2):polyoxyalkylene groups, such as (1):hydrogen atom, a methyl group, an ethyl group, a hydroxyethyl machine, and a hydroxypropyl machine. The included (Substituent A) (3):sulfoalkyl (machine B) (4):carboxy alkyl group (C), (5): The group chosen from a cationic substituent (D) is shown, Q is the same or different, the alkylene group of carbon numbers 2-4 is shown, and a, b, and c are the same or different, and show the number of 0-10. QO group, R group, a, b, and c are in a repetition unit, or may be the same between repetition units, or may differ, and the hydroxy group of - (D) may be replaced by above-mentioned (substituent A) substituent [ of further others ] (A) - (D). However, it has a substituent (A) at least as R. ]

As E1 in the general formula (1) of the substituent (A) containing a polyoxyalkylene group \*\*\*\*\* 2 or the thing of 3 is desirable, and ethylene, propylene, trimethylene, 2-hydroxy trimethylene one, 1-hydroxy methyl ethylene, 1-oxo-ethylene, 1-oxo-trimethylene one, 1-methyl 2-oxo-ethylene, etc. are specifically desirable.

As A in a general formula (1), a carbon number 2 or the thing of 3 is desirable, and ethylene, propylene, and trimethylene are specifically desirable. As the degree of polymerization [ being expressed with n (- OA-) ], 8-120, especially 10-60 are desirable from a point of the thickening effect and emulsification stability, and n A may be the same or may differ. n means the number of average addition moles here. An ether linkage is desirable although E2 is an ether linkage or an oxycarbonyl machine.

As R in a general formula (1), the alkyl group of carbon numbers 5-25 especially the straight chain of 6-20, or branched chain is desirable, and a point to the alkyl group, especially straight chain alkyl group of stability are desirable. An octyl machine, a decyl group, a dodecyl machine, a tetradecyl machine, a hexadecyl machine, an octadecyl machine, an isostearyl machine, etc. are specifically desirable.

The degree of substitution by the substituent (A) in the polysaccharide derivative of this invention has the desirable range of per [ 0.0001-1.0 ] composition simple sugar residue, further 0.0005 to 0.5, especially 0.001-0.1.

In addition to the above-mentioned substituent (A), the polysaccharide derivative of this invention may be replaced by one or more groups chosen from the substituent (B) shown further below, (C), and (D).

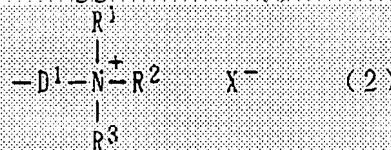
Moreover, the hydrogen atom of the hydroxy group of substituent (A) - (D) may be further replaced by substituent (A) - (D).

(B) The sulfoalkyl machine or its salt of the carbon numbers 1-5 which the hydroxy group may replace As a substituent (B) \*\*, 2-sulfoethyl machine, 3-sulfopropyl machine, a 3-sulfo 2-hydroxypropyl machine, a 2-sulfo 1-(hydroxymethyl) ethyl group, etc. are mentioned, and a 3-sulfo 2-hydroxypropyl machine is

especially more desirable than a stable side and a manufacture side. As for these substituents (B), the all or part may serve as a salt with organic cations, such as one groups, such as Na, K, Ca, and Mg, or 2 group element, amines, and ammonium, etc. The degree of substitution by these substituents (B) has the desirable range of per [ 0-1.0 ] composition simple sugar residue, further zero to 0.8, especially 0-0.5.

(C) The carboxy alkyl group or its salt of the carbon numbers 2-6 which the hydroxy group may replace As a substituent (C) \*\*, a carboxymethyl group, a carboxyethyl machine, a carboxypropyl machine, a carboxy butyl group, a carboxy pentyl machine, etc. are mentioned, and a carboxymethyl group is especially more desirable than a stable side and a manufacture side. As for these substituents (C), the all or part may serve as a salt with organic cations, such as one groups, such as Na, K, Ca, and Mg, or 2 group element, amine, and ammonium, etc. The degree of substitution by these substituents (C) has the desirable range of per [ 0-1.0 ] composition simple sugar residue, further zero to 0.8, especially 0-0.5.

(D) The group expressed with a following general formula (2)



Even if the hydroxy group has replaced D1 among [type The divalent saturated hydrocarbon group of the straight chain of the good carbon numbers 1-6 or branched chain is shown, R1, R2, and R3 are the same or different, the alkyl group of the straight chain of carbon numbers 1-3 or branched chain which the hydroxy group may replace is shown, and X- shows a hydroxy ion, a halogen ion, or an organic acid ion. ] As D1 in a cationic substituent (D), a carbon number 2 or the thing of 3 is desirable, and ethylene, propylene, trimethylene, 2-hydroxy trimethylene one, 1-hydroxy methyl ethylene, etc. are specifically desirable.

As R1 in a cationic substituent (D), R2, and R3, a methyl group, an ethyl group, a propyl group, 2-hydroxyethyl machine, etc. are mentioned, and a methyl group and an ethyl group are especially desirable.

As a halogen ion expressed with X- in a cationic substituent (D), a chlorine ion, a bromine ion, an iodine ion, etc. are mentioned, and CH<sub>3</sub>COO-, CH<sub>3</sub>CH<sub>2</sub>COO-, CH<sub>3</sub>(CH<sub>2</sub>)<sub>2</sub>COO-, etc. are mentioned as an organic acid ion. As X-, a hydroxy ion, a chlorine ion, and a bromine ion are desirable.

The degree of substitution by these cationic substituent (D) has the desirable range of zero to 0.5 per composition simple sugar residue, especially 0-0.3.

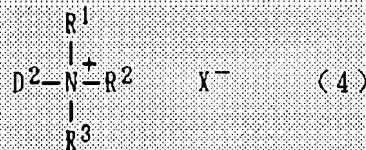
The polysaccharide derivative of this invention is the (a) following general formula (3), for example about polysaccharide or its inductor.

E3-(OA)<sub>n</sub>-E2-R (3)

Even if the epoxidation alkyl group of carbon numbers 3-6 and the hydroxy group have replaced E3 among [type The good straight chain of carbon numbers 1-6 or the good alkyl halide machine of branched chain, a carboxy group, the carboxy alkyl groups of carbon numbers 2-6, or those inductors are shown, and n, A, E2, and R show the same meaning as the above. ]

It comes out and is made to react with the polyoxyalkylene-ized agent expressed (c) c [ (b) shown further below and ] Or reach (d).

(b) Even if vinyl sulfonic acid and a hydroxy group have replaced The good haloalkane sulfonic acid of carbon numbers 1-5, The carboxy-ized agent (d) following general formula (4) chosen from the halogenation carboxylic acid of the carbon numbers 2-6 which the sulfuration agent (c) hydroxy group chosen from the sulfonic acid which has the epoxy group of carbon numbers 2-6, and those salts may replace, and its salt



D2 shows among [type the alkyl halide machine of the straight chain of carbon numbers 1-6, or branched chain which the epoxidation alkyl group of carbon numbers 3-6 or the hydroxy group may replace, and, as for R1, R2, R3, and X-, the same meaning as the above is shown. ]

It can manufacture by making it react with one or more compounds which come out and are chosen from the cation-ized agent expressed.

That is, the polysaccharide derivative of this invention is polyoxyalkylene-izing all the hydrogen atoms of the hydroxy group of polysaccharide or its inductor [introduction of a substituent (A)], Or it is obtained by polyoxyalkylene-izing the hydrogen atom concerned partially [introduction of a substituent (A)], and cation[ carboxy/ sulfuration [introduction of a sulfoalkyl machine (B)], and /-izing [introduction of a carboxy alkyl group (C)], and ]-izing if needed [introduction of a cationic substituent (D)]. Although these

polyoxyalkylene-ized reaction, a sulfuration reaction, a carboxy-ized reaction, and a cation-ized reaction may be performed in any order and 2-4 can also be reacted simultaneously. It is desirable to react in order of a polyoxyalkylene-ized reaction, a cation-ized reaction, a carboxy-ized reaction, and a sulfuration reaction.

As the polysaccharide used for this invention, or its inductor, A cellulose, a guar gum, starch, a pullulan, a dextran, a fructan, Polysaccharide, such as mannan, agar, carragheenan, a kitchen, chitosan, pectin, alginic acid, and a hyaluronic acid; the inductor which the methyl group, the ethyl group, the hydroxyethyl machine, the hydroxypropyl machine, etc. replaced by these is mentioned. It can replace in two or more independent or combination in a composition simple sugar residue, and these substituents are an example of a polysaccharide derivative. \*\*, hydroxyethyl cellulose, hydroxyethyl ethyl cellulose, A hydroxyethyl guar gum, hydroxyethyl starch, a methylcellulose, A methyl guar gum, methyl starch, ethyl cellulose, an ethyl guar gum, Ethyl starch, hydroxypropylcellulose, a hydroxypropyl guar gum, Hydroxypropyl starch, a hydroxyethyl methylcellulose, a hydroxyethyl methyl guar gum, hydroxyethyl methyl starch, hydroxypropyl methylcellulose, a hydroxy propylmethyl guar gum, hydroxy propylmethyl starch, etc. are mentioned. A cellulose, starch, hydroxyethyl cellulose, a methylcellulose, ethyl cellulose, and hydroxypropylcellulose are desirable among these polysaccharide or its inductor, and especially hydroxyethyl cellulose is desirable. Moreover, it is replacing the substituent of the above-mentioned polysaccharide derivative by the hydroxy group of a hydroxyethyl machine or a hydroxypropyl machine further, for example, forming a polyoxyethylene chain etc., The degree of substitution exceeding 3.0 per composition simple sugar residue is also possible, and, as for the degree of substitution per the composition simple sugar residue, 0.1-10.0, especially 0.5-5.0 are desirable. Moreover, the weight average molecular weight of these polysaccharide or its inductor has the desirable range of 10,000-10 million, 100,000-5 million, especially 300,000-2 million.

It divides into a polyoxyalkylene-ized reaction, a sulfuration reaction, a carboxy-ized reaction, and a cation-ized reaction hereafter, and explains.

<Polyoxyalkylene-ized reaction> The polyoxyalkylene-ized reaction of polysaccharide or its inductor makes a suitable solvent dissolve or distribute polysaccharide or its inductor, and is performed by making it react with the polyoxyalkylene-ized agent (a) expressed with said general formula (3).

As an epoxidation alkyl group of carbon numbers 3-6, 2, 3-epoxy propyl group, 3, 4-epoxy butyl group, 4, 5-epoxy pentyl machine, 5, and 6-epoxy hexyl group etc. is mentioned among the groups shown by E3 in a general formula (3). As the alkyl halide machine of the straight chain of the carbon numbers 1-6 which the hydroxy group may replace, or branched chain A \*\* 2-chloro ethyl group, 3-chloropropyl machine, 4-chlorobutyl machine, 6-chloro hexyl group, 2-bromo ethyl group, a 2-hydroxy 3-chloropropyl machine, a 1-hydroxymethyl 2-chloro ethyl group, etc. are mentioned. Moreover, it is a carboxy alkyl group of carbon numbers 2-6. A \*\* carboxymethyl group, a carboxyethyl machine, a carboxypropyl machine, A carboxy butyl group, a carboxy pentyl machine, etc. are mentioned, and a methyl ester ghost, ethyl esterification material, acid halide, a tosylation thing, a mesylation thing, an anhydride, etc. are mentioned as an inductor of these carboxy alkyl group or a carboxy group. As a desirable thing, a 2 and 3-epoxy propyl group, 2-chloro ethyl group, 3-chloropropyl machine, a 2-hydroxy 3-chloropropyl machine, carboxymethyl group, a carboxyethyl machine and its methyl ester ghost, or acid halide is mentioned among E3.

These polyoxyalkylene-ized agent (3) is an introduction amount for which a substituent [ as opposed to / it is independent, or can use it combining two or more sorts, and / polysaccharide or its inductor in the amount used ] (A) asks. Although it can adjust suitably, the range of 0.00015-5Eq is usually especially desirable 0.0001-10Eq per composition simple sugar residue of polysaccharide or its inductor.

It is desirable to perform this reaction under alkali existence or acid existence if needed, and it is this alkali. The hydroxide of \*\* 1 group or 2 group element, a carbonate, a bicarbonate, tertiary amine, etc. are mentioned, and sodium hydroxide, a potassium hydroxide, a calcium hydroxide, magnesium hydroxide, a pyridine, etc. are especially desirable. The amount of the alkali used gives 1.0 - a 10mol fold amount, and a result with the especially good range of 1.05 - a 5.0mol fold amount to the polyoxyalkylene-ized agent (3) to be used, and is desirable. Moreover, as an acid, a mineral acid, an organic acid, etc. are mentioned and sulfuric acid, hydrochloric acid, p-toluenesulfonic acid, methansulfonic acid, etc. are especially desirable. The amount of the acid used gives a 0.01-0.5mol fold amount and a result with the especially good range of a 0.1-0.3mol fold amount to the polyoxyalkylene-ized agent to be used, and is desirable. As a solvent, lower alcohol, for example, isopropyl alcohol, a tert-butylalcohol, etc. are mentioned. Moreover, you may use the solvent mixture which added 1 to 50weight % of water still more preferably 0.1 to 100weight % to lower alcohol in order to raise the reactivity of polysaccharide or its inductor, and a polyoxyalkylene-ized agent (3).

Especially reaction temperature has the desirable range of 30-100 degrees C 0-150 degrees C. After the end of a reaction can be neutralized using an acid or an alkali. As an acid, organic acids, such as inorganic acids, such as sulfuric acid, hydrochloric acid, and phosphoric acid, and acetic acid, are mentioned, and the hydroxide of one groups, such as sodium hydroxide, a potassium hydroxide, and magnesium

hydroxide, or 2 group element is mentioned as an alkali. Moreover, you may perform the next reaction, without neutralizing.

<Sulfuration reaction> The sulfuration reaction of polysaccharide or its inductor makes a suitable solvent dissolve or distribute polysaccharide or its inductor, and is performed by making it react with a sulfuration agent (b).

As the substitution halogen atom in the haloalkane sulfonic acid of the carbon numbers 1-5 which the hydroxy group may replace among sulfuration agents (b) A \*\* fluoride atom, a chlorine atom, a bromine atom, etc. are mentioned, and the salt of one groups, such as sodium salt, potassium salt, calcium salt, and magnesium salt, or 2 group element, ammonium salt, etc. are mentioned as these salts. As a sulfuration agent, vinyl sulfonic acid, 3-Harrow 2-hydroxy propane sulfonic acid, It is the introduction amount in which 3-HAROPURO bread sulfonic acid, 2, and 3-epoxy propane sulfonic acid is desirable, and these sulfuration agent is independent, or it can be used combining two or more sorts, and polysaccharide or the sulfonic group (B) to the inductor asks for the amount used. Although it can adjust suitably, the range of 0-2Eq is usually especially desirable 0-10Eq per composition simple sugar residue of polysaccharide or its inductor.

It is desirable to carry out under alkali existence if needed, as this alkali, the hydroxide of one group or 2 group element, a carbonate, a bicarbonate, etc. are mentioned, and a sulfuration reaction has sodium hydroxide, a potassium hydroxide, a calcium hydroxide, especially desirable magnesium hydroxide, etc. The amount of the alkali used gives a 0.1-3.0mol fold amount and a result with an especially good 0.5-1.5mol fold amount to the sulfuration agent to be used, and is desirable.

As a solvent, lower alcohol, for example, isopropyl alcohol, a tert-butylalcohol, etc. are mentioned. Moreover, you may use the solvent mixture which added 1 to 50weight % of water still more preferably 0.1 to 100weight % to lower alcohol in order to raise the reactivity of polysaccharide, or its inductor and sulfuration agent.

Especially reaction temperature has the desirable range of 30-100 degrees C 0-150 degrees C. After the end of a reaction can neutralize an alkali using an acid if needed. As an acid, organic acids, such as inorganic acids, such as sulfuric acid, hydrochloric acid, and phosphoric acid, and acetic acid, are mentioned. Moreover, you may perform the next reaction, without neutralizing.

<Carboxy-ized reaction> The carboxy-ized reaction of polysaccharide or its inductor makes a suitable solvent dissolve or distribute polysaccharide or its inductor, and is performed by making it react with a carboxy-ized agent (c) under existence of an alkali.

Specifically as a carboxy-ized agent (c), monochloroacetic acid, monochloro sodium acetate, monochloro potassium acetate, monobromoacetic acid sodium, monobromoacetic acid potassium, etc. are illustrated. It is independent, or can be used combining two or more sorts, and these carboxy-ized agent (c) is the amount used. Although the introduction amount for which polysaccharide or the carboxy alkyl group (C) to the inductor asks can adjust suitably, the range of 0-1Eq is usually especially desirable 0-10Eq per composition simple sugar residue of polysaccharide or its inductor.

As an alkali used for this reaction, sodium hydroxide, a potassium hydroxide, a calcium hydroxide, magnesium hydroxide, etc. are mentioned. The amount of the alkali used has 1.0 - a 3.0mol fold amount especially 1.05 - a desirable 2.5mol fold amount to the carboxy-ized agent (c) to be used. If too large [ if there are too few amounts of alkalis, rate of reaction will fall, and ], disassembly of polysaccharide or its inductor etc. is easy to produce and is not desirable.

Isopropyl alcohol, a tert-butylalcohol, etc. are mentioned as a solvent. Usually, it is the purpose which raises the reactivity of polysaccharide or its inductor, and a carboxy-ized agent (c), and the solvent mixture which added 1 to 50weight % of water to isopropyl alcohol or a tert-butylalcohol is used.

Especially reaction temperature has the desirable range of 30-100 degrees C 0-150 degrees C. After the end of a reaction can neutralize an alkali using an acid if needed. As an acid, organic acids, such as inorganic acids, such as sulfuric acid, hydrochloric acid, and phosphoric acid, and acetic acid, are mentioned. Moreover, you may perform the next reaction, without neutralizing.

<cation-ized reaction> The cation-ized reaction of polysaccharide or its inductor makes a suitable solvent dissolve or distribute polysaccharide or its inductor, and is performed by making it react with a cation-ized agent (d).

As the epoxidation alkyl group of the carbon numbers 3-6 among the groups shown by D2 in a general formula (4) \*\* 2, 3-epoxy propyl group, 3, 4-epoxy butyl group, 4, 5-epoxy pentyl machine, As an alkyl halide machine of the straight chain of the carbon numbers 1-6 which 5 and 6-epoxy hexyl group etc. was mentioned and the hydroxy group may replace, or branched chain, 2-chloro ethyl group, 3-chloropropyl machine, 4-chlorobutyl machine, 6-chloro hexyl group, 2-bromo ethyl group, a 2-hydroxy 3-chloropropyl machine, a 1-hydroxymethyl 2-chloro ethyl group, etc. are mentioned. As a desirable thing, 2, 3-epoxy propyl group, 2-chloro ethyl group, 3-chloropropyl machine, a 2-hydroxy 3-chloropropyl machine, etc. are mentioned among D2. It is independent, or can be used combining two or more sorts, and these cation-ized agent (d) is the amount used. Although the introduction amount for which polysaccharide or the cationic substituent (D) to the inductor asks can adjust suitably, the range of 0-5Eq is usually especially

desirable 0-10Eq per composition simple sugar residue of polysaccharide or its inductor.

It is desirable to carry out under alkali existence if needed, as this alkali, the hydroxide of one group or 2 group element, a carbonate, a bicarbonate, etc. are mentioned, and this reaction has sodium hydroxide, a potassium hydroxide, a calcium hydroxide, especially desirable magnesium hydroxide, etc. The amount of the alkali used gives 1.0 - a 3.0mol fold amount, and a result with the especially good range of 1.05 - a 1.5mol fold amount to the cation-ized agent (d) to be used, and is desirable.

As a solvent, lower alcohol, for example, isopropyl alcohol, a tert-butylalcohol, etc. are mentioned.

Moreover, you may use the solvent mixture which added 1 to 50weight % of water still more preferably 0.1 to 100weight % to lower alcohol in order to raise the reactivity of polysaccharide or its inductor, and a cation-ized agent (d).

Especially reaction temperature has the desirable range of 30-100 degrees C 0-150 degrees C. After the end of a reaction can neutralize an alkali using an acid. As an acid, organic acids, such as inorganic acids, such as sulfuric acid, hydrochloric acid, and phosphoric acid, and acetic acid, are mentioned. Moreover, you may perform the next reaction, without neutralizing.

When the polysaccharide derivative obtained at each above reaction uses for other reactions continuously, it does not neutralize but can use as it is, and also if needed, filtration etc. can classify, or the salts which washed with hot water, water isopropyl alcohol, water acetone, etc., and carried out subraw by an unreacted compound (a), (b), (c) or (d), neutralization, etc. can also be removed and used. In addition, when introduction of the target substituent is completed, after neutralizing and performing washing etc. after judgment by filtration etc. if needed, it can dry and the polysaccharide derivative of this invention can be obtained.

The polysaccharide derivative of this invention obtained in this way is having the rheology characteristic excelling in water solubility and viscosity increasing at the time of high temperature. It is useful as the thickener which is excellent in the handling nature at the time of low temperature, and shows sufficient thickening nature at the time of high temperature, and an emulsifier with the outstanding emulsification operation which makes a hydrophobic compound exist underwater very stably. Therefore, the aqueous composition containing the polysaccharide derivative of this invention makes a hydrophobic compound exist very stably according to emulsification of a polysaccharide derivative, distribution, and a protective colloid operation, when a hydrophobic compound exists.

The polysaccharide derivative aqueous composition containing this hydrophobic compound is variation per day. Or since it not only does not cause viscosity change and exterior change, such as separation, but a hydrophobic compound is efficiently emitted by addition of the surface-active agent generally used etc. when using a product, in the toiletries field, it is very useful.

Higher alcohols, sterols, silicone, a fluoride system oily medicine, an oily component, etc. which are blended as a hydrophobic compound in order to add the function and value of toiletries products are mentioned.

As a higher alcohol \*\*, for example, benzyl alcohol, an isocetyl alcohol, isostearyl alcohol, Behenyl alcohol, hexadecyl alcohol, phenyl ethyl alcohol, A cetanol, a stearyl alcohol, oleyl alcohol, 2-octyl dodecanol, batyl alcohol, 2-hexyl decanol, etc. are mentioned, and especially a cetanol and a stearyl alcohol are desirable.

Moreover, it is sterols. \*\*, for example, cholesterol, isostearic acid cholesteryl, provitamin D 3, Quan Beth Taylor, SUTEGU master Norian, a SUTEGUMA sterol, 5-dihydrocholesterol, alpha-spinasterol, Paris Taylor, a KURIONA sterol, gamma-sitosterol, SUTEGU mass tenor, a SARUGA sterol, an APENA sterol, ergostanol, A sitosterol, a KORUBI sterol, a KONDO lilac sterol, poriferasterol, A

HARIKURONA sterol, a NEOSU bongo sterol, a FUKOSUTE roll, Apt stanol, ERUGOSUTAJI enol, ergosterol, 22-dihydroergosterol, A BURASHIKA sterol, 24-methylene cholesterol, 5-dihydroergosterol, DEHIDORO ergosterol, a fungisterol, a cholestanol, a coprostanol, A JIMOSUTE roll, 7-HETOKO leste roll, a RATOSUTE roll, 22-dehydrocholesterol, beta-sitosterol, a cholest trien 3beta-oar, a coprostanol, a cholestanol, ergosterol, 7-dehydrocholesterol, a 24-DEHIDORO cholest dione 3beta-oar, equilenin, Equilin, estrone, 17beta-estradiol, and androst 4-\*\*\*\*\*-3 beta, 17beta-diol, DEHIDORO shrimp androsterone, ARUKE nil succinic acid cholesterol (JP,H5-294989,A), etc. are mentioned. Cholesterol, isostearic acid cholesteryl, and ARUKE nil succinic acid cholesteryl are [ among these ] especially desirable.

As silicone \*\* and the thing usually blended with toiletries products, for example, octamethyl polysiloxane, Tetra-decamethyl polysiloxane, a methylpolisiloxane, a high polymerization methylpolisiloxane, Octamethylcyclotetrasiloxane besides methylphenyl polysiloxane, methyl poly cyclosiloxane, such as decamethyl cyclopentasiloxane, and trimethylsiloxy silicic acid -- further Denaturation silicone, such as alkyl denaturation silicone, polyether alkyl denaturation silicone, amino denaturation silicone, fluoride denaturation silicone, alkyl glyceryl ether denaturation silicone, and denaturation organopolysiloxane given in JP,H6-72851,A, etc. is mentioned.

As a fluoride system oily medicine \*\*, perfluoro polyether which is the perfluoro organic compound of a liquid in ordinary temperature, Fluoride denaturation silicone is desirable and For example, perfluoro

decalin, perfluoro adamantane, Perfluoro butyl tetrahydro furan, perfluoro octane, perfluoro nonane, perfluoro pentane, perfluoro decane, perfluoro dodecane, perfluoro polyether, etc. are mentioned. Moreover, it is an oily component. \*\*, volatility, and nonvolatility -- any are sufficient -- for example, the shape of a solid or liquid-like paraffin -- Vaseline, crystal oil, ceresin, ozokerite, montan wax, Hydrocarbon, such as squalane and squalene; Eucalyptus oil, mentha oil, camellia oil, A macadamia-nuts oil, an avocado oil, beef tallow, lard, horse fat, yolk oil, olive oil, A carnauba wax, lanolin, jojoba oil; Glycerin monostearin acid ester, Glycerin distearic acid ester, glycerin mono-oleate, Palmitic acid isopropyl, stearic acid isopropyl, butyl stearate, Myristic acid isopropyl, neopentylglycol dicaprate, Diethyl phthalate, a lactic acid millimeter still, adipic acid diisopropyl, myristic acid Sept Iles, A lactic acid millimeter still, adipic acid diisopropyl, myristic acid Sept Iles, Lactic acid Sept Iles, a 1-iso stearoyl 3-myristoyl glycerol, 2-ethylhexanoic acid Sept Iles, palmitic acid-2-ethylhexyl, myristic acid-2-octyldecyl, G 2-ethylhexanoic acid neopentyl glycol, oleic acid-2-octyldecyl, a bird isostearic acid glycerol, Ester oil, such as G p-methoxy cinnamon acid-Monod 2-ethylhexanoic acid glycetyl; higher fatty acids, such as stearic acid, a palmitic acid, and oleic acid; And function oily matter, such as natural oil refinement of a rosemary, Aspalathus linears, royal jelly, Hamah Melis, etc., lignan, vitamin E, oil-soluble vitamin C, a vitamin A inductor, ceramides, quality of a ceramide similar structure, an oil-soluble ultraviolet ray absorbent, and perfume, etc. is mentioned.

As for the polysaccharide derivative content of an aqueous composition, 0.01 to 5 weight % is desirable, and its 0.05 to 2 weight % is more desirable. When adding a hydrophobic compound, 0.0001 to 50 weight % is desirable, and 0.001 to 30 weight % is more desirable.

The surface-active agent, the dispersing agent, a solvent, perfume, a color, mineral salt, a pH adjuster, etc. which are usually used for toiletries products can be arbitrarily added to the polysaccharide derivative content aqueous composition of this invention.

The aqueous composition containing the polysaccharide derivative of this invention and this can be used for various toiletries products, such as baths, a massage cosmetic, a shower agent, a skin care agent, a charge of hair washing, a whole body cleaning agent, a cleaning agent for garments, coupling finish for garments, and a hard surface cleaning agent.

**EXAMPLE** In the following work examples, it is the degree of substitution of the substituent (A) of the polysaccharide derivative of this invention. It asked for the degree of substitution of the sulfoalkyl machine (B), the carboxy alkyl group (C), and the cationic substituent (D) by the colloidal titration method the Zeisel method [D.G. Anderson, Anal. Chem., 43,894 (1971)]. In addition, in the following work examples, "the degree of substitution" shows the number of averages of the substituent per composition simple sugar residue.

Work example 1 The hydroxyethyl cellulose (HEC-QP 15000H, made in Union Carbide) 80g, isopropyl alcohol 640g, and 2.0g of p-toluenesulfonic acid of the weight average molecular weight 800,000 [about] and the degree 1.8 of substitution of a hydroxyethyl machine are mixed. Slurry liquid was prepared and it agitated for 30 minutes at the bottom room temperature of nitrogen-gas-atmosphere mind.

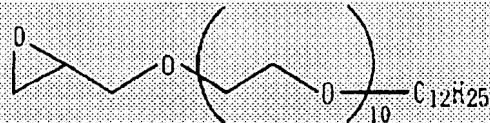
It is the following formula to this solution.



Came out, added 15g of compounds expressed, it was made to react at 80 degrees C for 8 hours, and polyoxyalkylene-ization was performed. Reaction mixture was neutralized in the sodium hydroxide aqueous solution 48% after the end of a reaction, and the \*\* exception carried out the resultant. Isopropyl alcohol 500g washed the resultant twice by isopropyl alcohol 500g 80%, it dried at 70 degrees C under decompression one whole day and night, and 73.4g of hydroxyethyl cellulose inductors (this invention compound 1) were obtained.

The degree of substitution of the substituent containing the polyoxyalkylene group of the obtained hydroxyethyl cellulose inductor was 0.010.

Work example 2 80g of potato starch (made by the Katayama chemistry company), 50% isopropyl alcohol 640g, and 5.5g of 48% sodium hydroxide aqueous solutions were mixed, slurry liquid was prepared, and it agitated for 30 minutes at the bottom room temperature of nitrogen-gas-atmosphere mind. It is the following formula to this solution.



Came out, added 19.0g of compounds expressed, it was made to react at 80 degrees C for 8 hours, and polyoxyalkylene-ization was performed. Acetic acid neutralized reaction mixture after the end of a reaction, and the \*\* exception carried out the resultant. Subsequently Acetone 500g washed the resultant

twice by 50% of isopropyl alcohol 500g, it was dried at 70 degrees C under decompression one whole day and night, and 69.4g of polyoxyalkylene-ized starch inductors (this invention compound 2) were obtained. The degree of substitution of the substituent containing the polyoxyalkylene group of the obtained starch inductor was 0.005.

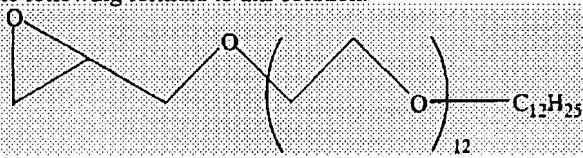
Work example 3 20.0g of polyoxyalkylene-ized starch inductors obtained in the work example 2, 70% isopropyl alcohol 200g, 3-chloro 2-hydroxy propane sulfonic acid sodium 42.6g, and 18.0g of 48% sodium hydroxide aqueous solutions In addition, sulfuration was performed at 50 degrees C for 5 hours. After the end of a reaction, acetic acid neutralized reaction mixture and the \*\* exception carried out the product. It dried 3 times by isopropyl alcohol 400g 70%, the product was dried at 70 degrees C under decompression after 2 times washing by isopropyl alcohol 300g one whole day and night, and polyoxyalkylene-izing and 38.3g of sulfurated starch inductors (this invention compound 3) were obtained.

The degree of substitution of the 3-sulfo 2-hydroxypropyl machine of the obtained starch inductor was 0.301.

Work example 4 35.5g of polyoxyalkylene-ized starch, the 70% isopropyl alcohol 350g, and 2.4g of 48% sodium hydroxide aqueous solutions which were obtained in the work example 2 were mixed, slurry liquid was prepared, and it agitated at the bottom room temperature of nitrogen-gas-atmosphere mind for 30 minutes. 25.1g of monochloro sodium acetate and 18.0g of 48% sodium hydroxide aqueous solutions were added to reaction mixture, and carboxymethyl-ization was performed at 50 degrees C for 5 hours. After the end of a reaction, acetic acid neutralized reaction mixture and the \*\* exception carried out the product. It dried 3 times by isopropyl alcohol 400g 70%, the product was dried at 70 degrees C under decompression after 2 times washing by isopropyl alcohol 300g one whole day and night, and polyoxyalkylene-izing and 33.8g of carboxymethyl-ized starch inductors (this invention compound 4) were obtained. The degree of carboxymethyl-izing of the obtained starch inductor was 0.48.

Work example 5 35.5g of polyoxyalkylene-ized starch, the 70% isopropyl alcohol 350g, and 2.4g of 48% sodium hydroxide aqueous solutions which were obtained in the work example 2 were mixed, slurry liquid was prepared, and it agitated at the bottom room temperature of nitrogen-gas-atmosphere mind for 30 minutes. 7.0g of trimethylammonium chloride aqueous solutions and 2.0g of 48% sodium hydroxide aqueous solutions were added to reaction mixture 60% (3-chloro 2-hydroxypropyl), and cation-ization was performed at 50 degrees C for 1 hour. After the end of a reaction, acetic acid neutralized reaction mixture and the \*\* exception carried out the product. It dried 3 times by isopropyl alcohol 400g 70%, the product was dried at 70 degrees C under decompression after 2 times washing by isopropyl alcohol 300g one whole day and night, and polyoxyalkylene-izing and 34.2g of cation-ized starch inductors (this invention compound 5) were obtained. The degree of cation-izing of the obtained starch inductor was 0.10.

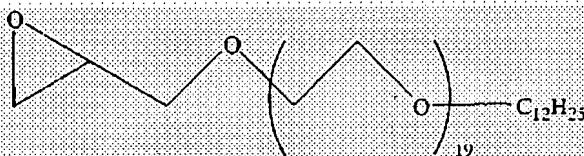
Work example 6 The hydroxyethyl cellulose (HEC-QP100MH, made in Union Carbide) 80g, the 80% isopropyl alcohol 640g, and 5.34g of 48% sodium hydroxide aqueous solutions of the weight average molecular weight 1,500,000 and the degree 1.8 of substitution of a hydroxyethyl machine are mixed. Slurry liquid was prepared and it agitated for 30 minutes at the bottom room temperature of nitrogen-gas-atmosphere mind. It is the following formula to this solution.



Came out, added 12.78g of compounds expressed, it was made to react at 80 degrees C for 8 hours, and polyoxyalkylene-ization was performed. Acetic acid neutralized reaction mixture after the end of a reaction, and the \*\* exception carried out the resultant. The resultant was dried twice at 60 degrees C under decompression by isopropyl alcohol 500g one whole day and night, and 72.0g of polyoxyalkylene-ized hydroxyethyl cellulose inductors (this invention compound 6) were obtained.

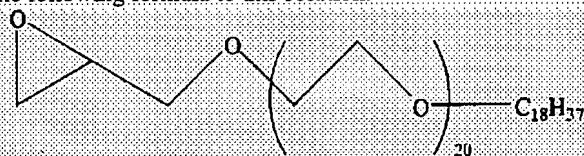
The degree of substitution of the substituent containing the polyoxyalkylene group of the obtained hydroxyethyl cellulose inductor was 0.004.

Work example 7 The hydroxyethyl cellulose (HEC-QP100MH, made in Union Carbide) 80g, the 80% isopropyl alcohol 640g, and 5.34g of 48% sodium hydroxide aqueous solutions of the weight average molecular weight 1,500,000 and the degree 1.8 of substitution of a hydroxyethyl machine are mixed. Slurry liquid was prepared and it agitated for 30 minutes at the bottom room temperature of nitrogen-gas-atmosphere mind. It is the following formula to this solution.



Came out, added 21.7g of compounds expressed, it was made to react at 80 degrees C for 8 hours, and polyoxyalkylene-ization was performed. Acetic acid neutralized reaction mixture after the end of a reaction, and the \*\* exception carried out the resultant. The resultant was washed twice by isopropyl alcohol 500g, it dried at 60 degrees C under decompression one whole day and night, and 74.0g of polyoxyalkylene-ized hydroxyethyl cellulose inductors (this invention compound 7) were obtained. The degree of substitution of the substituent containing the polyoxyalkylene group of the obtained hydroxyethyl cellulose inductor was 0.004.

Work example 8 The hydroxyethyl cellulose (HEC-QP 15000H, made in Union Carbide) 80g, the 80% isopropyl alcohol 640g, and 5.34g of 48% sodium hydroxide aqueous solutions of the weight average molecular weight 800,000 and the degree 1.8 of substitution of a hydroxyethyl machine are mixed. Slurry liquid was prepared and it agitated for 30 minutes at the bottom room temperature of nitrogen-gas-atmosphere mind. It is the following formula to this solution.

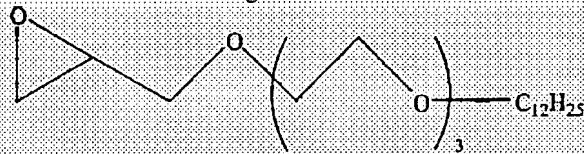


Came out, added 13.7g of compounds expressed, it was made to react at 80 degrees C for 8 hours, and polyoxyalkylene-ization was performed. Acetic acid neutralized reaction mixture after the end of a reaction, and the \*\* exception carried out the resultant. The resultant was washed twice by isopropyl alcohol 500g, it dried at 60 degrees C under decompression one whole day and night, and 69.0g of polyoxyalkylene-ized hydroxyethyl cellulose inductors (this invention compound 8) were obtained. The degree of substitution of the substituent containing the polyoxyalkylene group of the obtained hydroxyethyl cellulose inductor was 0.003.

Comparative example 1 It was considered as the comparison compound 1, using the hydroxyethyl cellulose (HEC-QP 15000H, made in Union Carbide) of the weight average molecular weight 800,000 [ about ] and the degree 1.8 of substitution of a hydroxyethyl machine as it is.

Comparative example 2 It was considered as the comparison compound 2, using the methylcellulose (SM-1500, Shin-Etsu Chemical Co., Ltd. make) of the degree 1.8 of substitution of a weight-average molecular-weight about 300,000 methoxy group as it is.

Comparative example 3 The hydroxyethyl cellulose (HEC-QP100MH, made in Union Carbide) 80g, the 80% isopropyl alcohol 640g, and 5.34g of 48% sodium hydroxide aqueous solutions of the weight average molecular weight 1,500,000 and the degree 1.8 of substitution of a hydroxyethyl machine are mixed. Slurry liquid was prepared and it agitated for 30 minutes at the bottom room temperature of nitrogen-gas-atmosphere mind. It is the following formula to this solution.



Came out, added 4.8g of compounds expressed, it was made to react at 80 degrees C for 8 hours, and polyoxyalkylene-ization was performed. Acetic acid neutralized reaction mixture after the end of a reaction, and the \*\* exception carried out the resultant. The resultant was washed twice by isopropyl alcohol 500g, it dried at 60 degrees C under decompression one whole day and night, and 72.3g of polyoxyalkylene-ized hydroxyethyl cellulose inductors (comparison compound 3) were obtained.

The degree of substitution of the substituent containing the polyoxyalkylene group of the obtained hydroxyethyl cellulose inductor was 0.004.

Example 1 of an examination Thickening nature examination The churning dissolution of 1.0g of this invention compounds and 4.0g of the comparison compounds was carried out at the ion exchange water of 200mL, respectively, and the viscosity of each aqueous solution was measured at the water temperature of 10 degrees C, and 60 degrees C after neglect with the room temperature one whole day and night. In addition, viscosity was measured using the Brookfield viscometer (12rpm). The result is shown in Table 1.

表 1

	水溶液粘度 (mPa · s)	
	10 °C	60 °C
本発明化合物 1	420	2300
本発明化合物 2	6500	12000
本発明化合物 3	6000	10500
本発明化合物 4	5400	9300
本発明化合物 5	6300	9800
比較化合物 1	20000	1600
比較化合物 2	2500	400

The polysaccharide derivative of this invention was what has the thickening nature which was excellent at the time of high temperature so that clearly from Table 1 while giving the high aqueous solution of transparency.

Example 2 of an examination Emulsification stability test The aqueous composition was prepared by adding ion exchange water gradually, agitating to the dispersed solution of a polysaccharide derivative and the dispersed solution of an oily medicine or a polysaccharide derivative, glycerin, and an oily medicine.

In the case of the aqueous composition which blended the surface-active agent, after preparing the above-mentioned dispersed solution, it prepared by adding a surface-active agent.

The obtained aqueous composition was saved for one month at a room temperature and 40 degrees C, and stability (existence of separation) was evaluated. The result is shown in Table 2.

2

充明品		比較品			
5	6	7	8	1	2
0.5	0.5	0.5	0.5	0.5	0.5
9.5	9.5	9.5	9.5	9.5	9.5
5	5	5	5	5	5
5	5	5	5	5	5
15	15	15	15	15	15
八ヶ岳	八ヶ岳	八ヶ岳	八ヶ岳	八ヶ岳	八ヶ岳
○	○	○	○	分離	分離
○	○	○	○	分離	分離

	本発明化合物			
	1	2	3	4
本発明化合物6	0.5	0.5	0.5	0.5
本発明化合物7				
比較化合物3				
8.6%グリセリン シリコンオイル (KF96A 6CS, 信越シリコーン (株)製)	9.5	9.5	5	
スクワラン	5			
ヒマワリ油 ミリストン酸イソステアリン酸 リチロール		5		
ラウリル硫酸ナトリウム ポリオキシエチレンラウリル硫酸 エステル			15	
イオン交換水				15
安定性 (室温 2ヶ月)	○	○	○	○
安定性 (40°C 1ヶ月)	○	○	○	○

The polysaccharide derivative of this invention emulsifies a hydrophobic compound good, and the stability of the obtained aqueous composition is better than Table 2. Moreover, it turns out that the stability is not spoiled by existence of a surface-active agent, either.

Work example 8 Baths Each ingredient of Table 3 was uniformly mixed with the Henschel mixer, and powder type baths were obtained.

表 3

成 分	配合量 (重量%)
本発明化合物1	9.0
炭酸水素ナトリウム	8
ポリエチレングリコール6000 (粉末)	1.9
色素	0.1

When 200g of obtained powder type baths were dissolved in the bath water of 180L, in the water temperature of 40 degrees C, bath water viscosity was 160 mPa·s. Moreover, when water temperature fell at 25 degrees C, bath water viscosity is 20 mPa·s, and was able to be drained good. Furthermore, this bath water has been satisfactorily used also as wash service water in an automatic washing machine.

Work example 9 The shampoo of the composition shown below was manufactured using this invention compound 6.

(Composition) (weight %)

A polyoxyethylene alkyl-sulfuric-acid ester 15.0 palmitic-acid isopropyl 5.0 this invention compound 60.5 lauroyl diethanolamide 3.0 lauryldimethyl amine oxide 0.5 hydroxyethyl-cellulose (made by DAICEN) 0.1 sodium-benzoate 0.3 pigment proper-quantity scent Charge proper-quantity citric acid It is water in proper quantity. Balance meter 100.0 comparative examples 4 The shampoo was manufactured in the work example 9, without using this invention compound 6.

The shampoo of the work example 9 is excellent in foamability and detergency compared with the comparative example 4, and the feel after dryness was also excellent at the time of a rinse.

Work example 10 The body shampoo of the composition shown below was manufactured using the compound 7 of this invention.

(Composition) (weight %)

Mono-lauryl phosphate potassium salt 15.0 bird isostearic acid glycerol 5.0 this invention compound 70.5 polyoxyethylene (EO3) lauryl glucoside 5.0 lauryldimethyl amine oxide 3.0 glycerin 4.0 sucrose-fatty-

acid-ester 1.0 methyl paraben 0.3 pigment proper-quantity perfume It is citric acid in proper quantity. It is a water balance meter in proper quantity. 100.0 comparative examples 5 In a work example 10, The body shampoo was manufactured without using this invention compound 7.

The body shampoo of the work example 10 is excellent in foamability and detergency compared with the comparative example 5, was washed, also carried out the feel after going up gently, and was good.

Work example 11 Milky lotion The milky lotion was prepared using this invention compound 7 by the following formulas. Compared with the comparative example 6, it excelled in stability, a feeling of use was not sticky, either, and this milky lotion was good.

(Composition) (weight %)

Squalane 5.0 olive-oil 8.0 jojoba-oil 1.0 polyoxyethylene hydrogenated-castor-oil (10EO) 1.0 monostearin acid sorbitan 1.0 this invention compound 7 0.5 butyl paraben 0.1 methyl paraben 0.1 ethanol 5.0 glycerin 3.0 perfume 0.05 water Balance comparative example 6 The milky lotion was prescribed in the work example 11, without using this invention compound 7.

Work example 12 Face toilet By the following formulas, face toilet was prepared using this invention compound 7. This face toilet was stable compared with the comparative example 7, and its feeling of use was also good.

(Composition) (weight %)

Polysaccharide derivative 0.15p-zinc phenolsulfonate 0.2 water of the ethanol 5.0 glycerin 3.0 polyethylene-glycol 15004.0 polyoxyethylene oleyl ether (20EO) 0.3 polyoxyethylene hydrogenated-castor-oil (30EO) 0.2 this invention compound 7 Balance comparative example 7 Set in the work example 12. Face toilet was prescribed without using this invention compound 7.

Work example 13 Softening agent for garments The softening agent for garments was prepared by the following formulas using this invention compound 7. As compared with the comparative example 8, this softening agent for garments is excellent in stability, and aesthetic property is also excellent. Moreover, the smell of the perfume sensed from the clothing after dryness was also strong.

(Composition) (weight %)

Dioleoyl ethyl dimethylammonium chloride 15.0 this invention compound 80.5 amino denaturation silicone 5.0 polyoxyethylene lauryl ether (m= 21) 2.0 glycerin 1.0 calcium-chloride proper-quantity perfume 0.3 water Balance comparative example 8 Set in the work example 13. The softening agent for garments was prescribed without using this invention compound 7.

Work example 14 Liquid detergent for garments The liquid detergent for garments was prepared by the following formulas using this invention compound 7. This detergent was excellent in detergency and stability compared with the comparative example 9, and its aesthetic property of the garments after dryness was also good.

(Composition) (weight %)

Nonionic interface active agent 5.0 (what carried out block addition of an average of 5mol of EO(s), an average of 2mol of PO(s), and an average of 5mol of the EO(s) at the first-class alcohol of C10 - 14)

Nonionic interface active agent 30 (an average of 8mol of the second class alcohols EO of C10 - 14, thing which carried out block addition of an average of 1mol of the PO(s))

LAS-S agent 1.5C12-14 fatty-acid Na salt 1.0 this invention compound 7 0.5 amino denaturation silicone 5.0 polyethylene-glycol phenyl ether 5.0 diethanolamine 8.0 propylene-glycol 6.0 ethanol 2.0 sulfurous-acid Na 0.3 perfume Water measurement balance meter which sets a proper quantity of NaOH stock solution pH to 10.5 100.0 comparative examples 9 In a work example 13, The liquid detergent for garments was prescribed without using this invention compound 7.

Industrial availability The polysaccharide derivative of this invention is having the rheology characteristic excelling in water solubility and viscosity increasing at the time of high temperature. As a thickener which is excellent in the handling nature at the time of low temperature, and shows sufficient thickening nature at the time of high temperature moreover, as an emulsifier with the outstanding emulsification operation whose hydrophobic compound is made to exist underwater very stably. It is very useful as the various thickener and various stabilizing agents of toiletries products, such as viscous baths, a massage cosmetic, a shower agent, a skin care agent, a charge of hair washing, a whole body cleaning agent, a cleaning agent for garments, coupling finish for garments, and a hard surface cleaning agent.

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